

# LSB based Digital Watermarking Technique

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## Abstract

Water marking has been proposed as a method to enhance data security. Text water marking requires extreme care when embedding additional data within the images because the additional information must not affect the image quality. Digital water marking is a method through which we can authenticate images, videos and even texts. Add text water mark and image water mark to your photos or animated image, protect your copyright avoid unauthorized use. Water marking functions are not only authentication, but also protection for such documents against malicious intentions to change such documents or even claim the rights of such documents. Water marking scheme that hides water marking in method, not affect the image quality. In this paper method of hiding a data using LSB replacement technique is proposed.

**Keywords: Digital Watermarking, Authentication, Robust, Secure, Copyright Protection**

## I. INTRODUCTION

Digital watermarking is the technique of embedding a digital signal (audio, video or image) or hide a small amount of digital data which cannot be easily removed is called digital watermarking. Digital watermarking is also called data embedding. Watermarking can be applied to images, audio, video and to any software also. Digital watermarking is used to hide the information inside a signal, which cannot be easily extracted by the third party. Its widely used application is copyright protection of digital information. It is different from the encryption in the sense that it allows the user to access, view and interpret the signal but protect the ownership of the content.

Watermarking of the image could be visible, for example, a background transparent signature, or could be perceptually invisible. A visible watermark acts like a deterrent but may not be acceptable to users in some context. In order to be effective, an invisible watermark should be secure, reliable and resistance to common signal processing operations and intentional attacks.

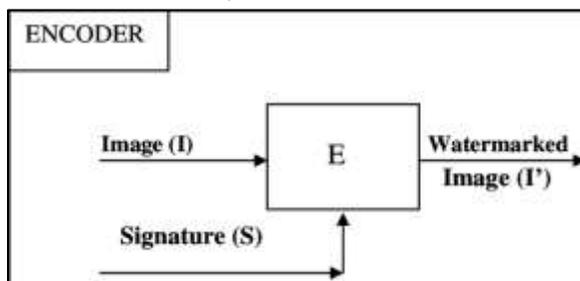


Fig. 1: General encoding process of watermarking

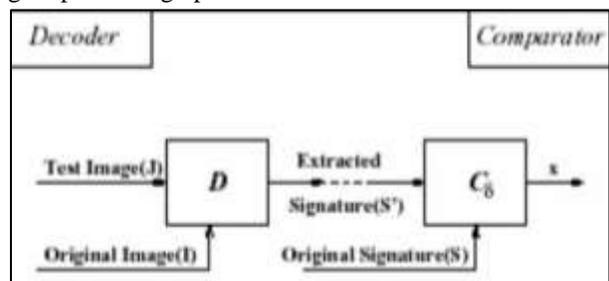


Fig. 2: General decoding process of watermarking

## II. CLASSIFICATION OF WATERMARKING

Digital Watermarking techniques can be classified as:

- Text Watermarking
- Image Watermarking
- Audio Watermarking
- Video Watermarking

In other way, the digital watermarks can be divided into three different types as follows:

- Visible watermark
- Invisible Robust watermark

- Visible Fragile watermark

### III. REQUIREMENTS OF IMAGE WATERMARKING

An image watermarking system needs to have at least the following two components:

- A watermarking embedding system
- A watermarking extraction (recovery) system.

The watermark embedding system takes input comprising of watermark bit, the image data, and optionally a secret or public key. The output of the watermark embedding system is the watermarked image. The watermark extraction system takes as input an image that possibly contains a watermark and possibly a secret or public key and extracts out the watermark information.

### IV. WATERMARKING PROPERTIES

A watermark is designed to permanently reside in the host data. When the ownership of data is in question, the information can be extracted to completely characterize the owner. To achieve maximum protection of intellectual property with depend on application such as robust watermarking is required for copyright protection. Among the desirable properties which a watermark should have are:

#### **A. Perceptual Transparency**

A digital watermark should not be noticeable to the viewer nor should it degrade the quality of content. The watermark should be imperceptible so as not to affect the viewing experience of the image or the quality of the audio or a video signal.

#### **B. Undetectable**

The watermark must be difficult or even impossible to remove by malicious attacker or cracker, at least without obviously degrading the host signal.

#### **C. Robustness**

A watermark must be difficult to remove. The attempt to destroy the mark by adding a noise should result in the degradation of the perceptual quality of the host data so as to render it unusable.

#### **D. Security**

This is a description of how easy it is to intentionally remove a watermark example by deletion, modification or buying of the watermark in another illicit one.

#### **E. Data Capacity**

Amount of information that can be stored within the content.

### V. TECHNIQUES OF WATERMARKING

#### **A. Frequency Domain Watermarking**

These methods are similar to spatial domain watermarking in that the values of selected frequencies can be altered. Because high frequencies will be lost by compression or scaling, the watermark signal is applied to lower frequencies, or better yet, applied adaptively to frequencies containing important elements of the original picture.

#### **B. Spread Spectrum**

This technique can be used for both spatial domain and frequency domain. The spread spectrum method has the advantage that the watermark extraction is possible without using the original unmarked image.

#### **C. Spatial Domain Techniques**

Techniques in spatial domain class generally share the following characteristics:

- The watermark is applied in the pixel domain.
- No transforms are applied to the host signal during watermark embedding.
- Combination with the host signal is based on simple operations, in the pixel domain.
- The watermark can be detected by correlating the expected pattern with the received signal.

## VI. LEAST SIGNIFICANT BIT (LSB)

- It is the byte or octet in that position of a multi byte number which has the least potential value.
- The least significant bit (LSB) gives the unit value and it shows the bit position in a binary integer.
- It determines whether the number is odd or even.
- The LSB is sometimes referred to as the right-most bit, due to the convention in positional notation of writing less significant digit further to the right.
- It is analogous to the least significant digit of a decimal integer, which is the digit in the ones (right-most) position.
- If the number changes even slightly then the least significant bits have the useful property of changing rapidly.
- It is easy to understand.
- Simple to implement.
- It shows the binary representation of decimal 150. Here LSB represents a value of 0. The MSB is an 8-bit binary number which represents a value of 128 decimal.

## VII.RESULTS

We have taken landscape.jpg as cover image of size 512\*512. Leena.jpg is embedded in the cover image as the watermark.

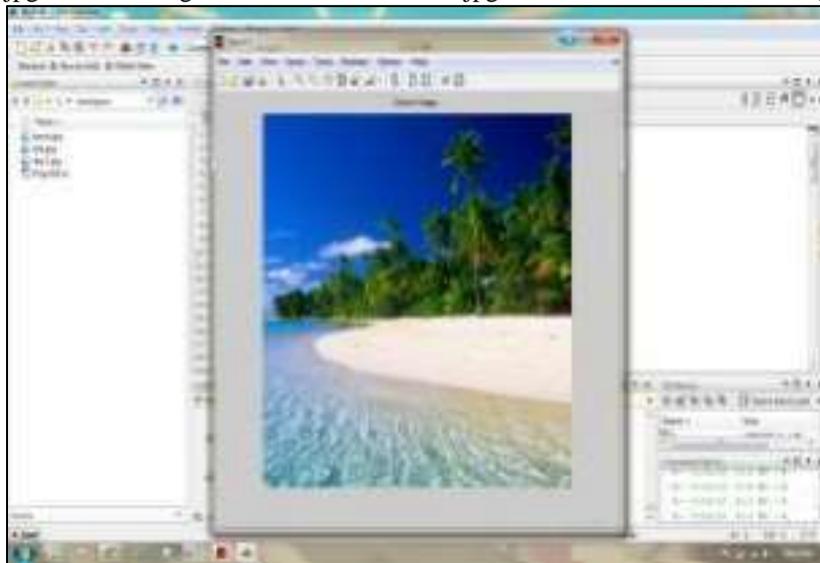


Fig. 3: Cover Image

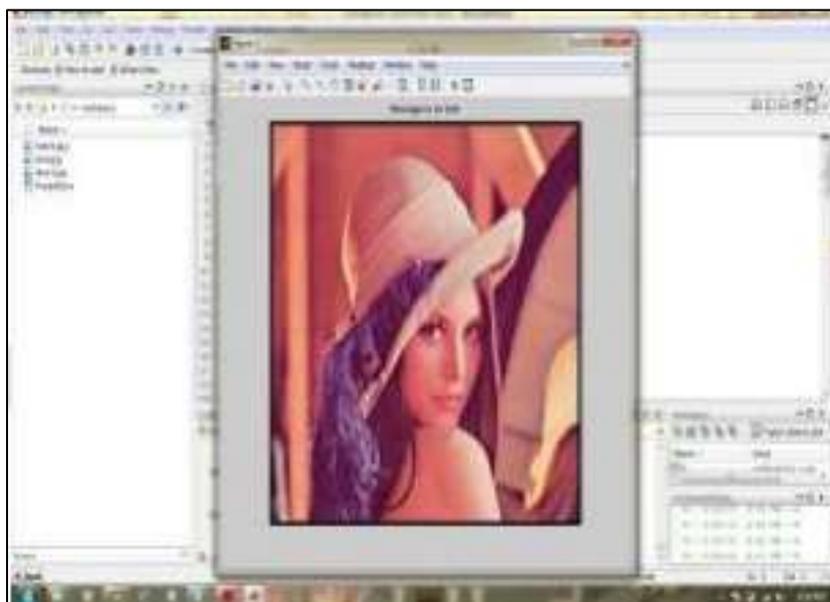


Fig. 4: Watermark Image

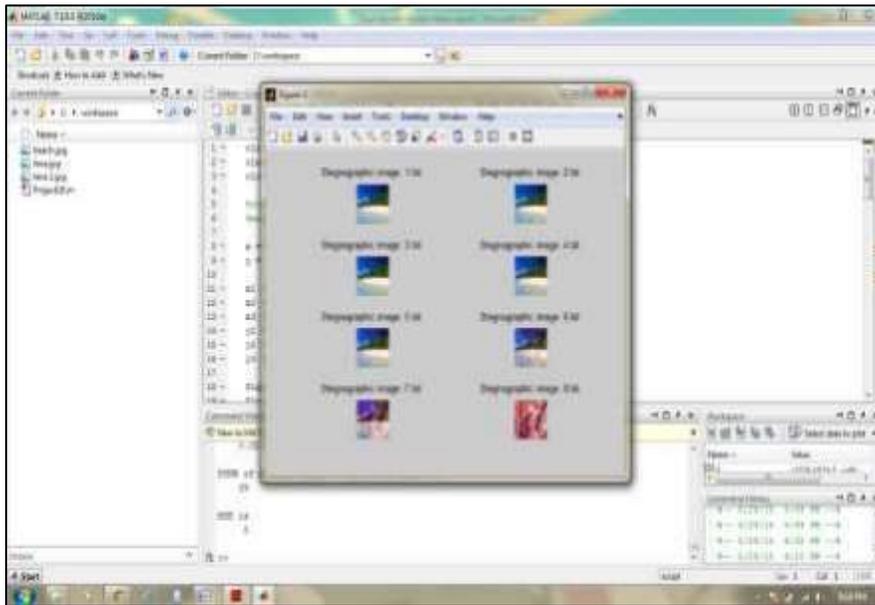


Fig. 5: Watermarking Encryption

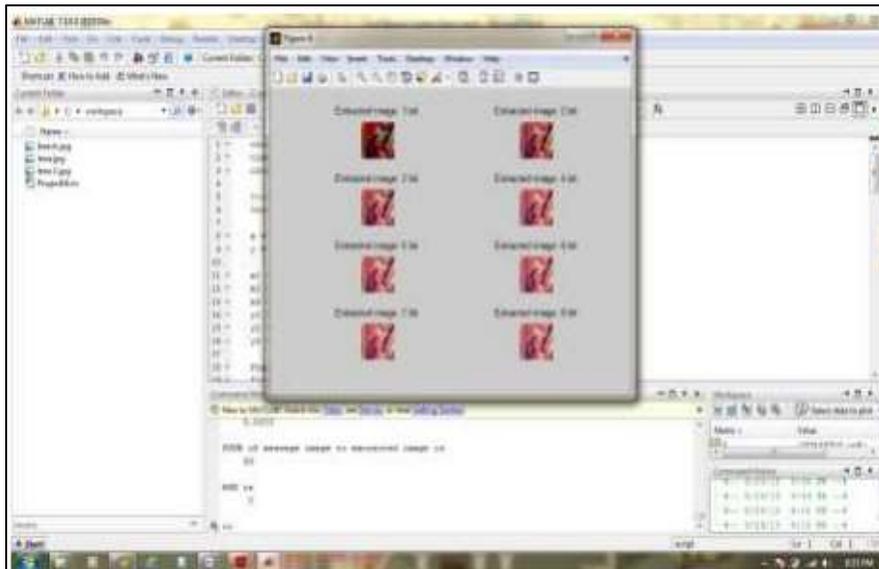


Fig. 6: Watermarking Decryption

### VIII. CONCLUSION AND FUTURE SCOPE

The increasing amount of security threats we need large security needs. Multimedia documents and specifically images are affected. In the current state of research, it is difficult to affirm which watermarking approach seems most suitable to ensure a secure transfer of data. The tool used for the execution of this algorithm was Matlab. The aim of the program is to replace the LSB of the base image with the MSB of the watermark. In future LSB may also use for other type of data and test on different type of images and we can get more noise free images.

### REFERENCES

- [1] Deepshikha Chopra, Preeti Gupta, Gaur Sanjay B.C., Anil Gupta, "Lsb Based Digital Image Watermarking For Gray Scale Image", IOSR Journal of Computer Engineering (IOSRJCE)ISSN: 2278-0661, ISBN: 2278-8727 Volume 6, Issue 1 (Sep-Oct. 2012), PP 36-41
- [2] International Journal of Computer Science and Information Technologies, Vol. 3 (2) , 2012,3757-3760 "Digital Image Watermarking for Copyright Protection" by Shankar Thawkar Department of Information Technology Hindustan College of Science and Technology, Mathura (UP), India
- [3] "Image Watermarking Using LSB (Least Significant Bit)" Gurpreet Kaur, Kamaljeet Kaur
- [4] (IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 3 (2), 2012, Digital Image Watermarking For Copyright Protection by Shankar Thawkar Department of Information Technology Hindustan College of Science and Technology, Mathura (UP), India